William MacCormac, Th. Oliver (Newcastle-on-Tyne), W. M. Ord, Richard Quain, George Paget (Cambridge), James Paget (Chairman), F. W. Pavy, George Porter (Dublin), R. Douglas Powell, J. Russell Reynolds, William Roberts, Ch. S. Roy (Cambridge), T. Burdon Sanderson (Oxford), E. A. Schäfer, S. G. Shattock, John Simon, A. R. Simpson (Edinburgh), E. M. Skerritt (Clifton, Bristol), Th. Grainger Stewart (Edinburgh), William Stokes (Dublin), Octavius Sturges, Th. Pridgin Teale (Leeds), William Turner (Edinburgh), Hermann Weber, Spencer Wells, C. S. Wheelhouse (Leeds), Samuel Wilks, A. H. Young (Manchester).

NOTES.

THE annual general meeting of the Geological Society will be held on Friday, February 20, at 3 p.m., and the Fellows and their friends will dine together at the Hôtel Métropole, Whitehall Place, at 7.30 p.m.

ON Tuesday Mr. C. Parker called attention in the House of Commons to the question of secondary education in Scotland, and moved, "That, for the better organization in Scotland of higher education, it is desirable that there should be grants in aid of it, not only, as at present, to the Universities and to primary schools, but also (as recommended by a Departmental Committee in 1888) to the public secondary schools, on condition of their general efficiency, and of free places being reserved in them for competition among children from the grant-aided primary schools." The motion was seconded by Mr. Parker Smith, and supported by Mr. D. Crawford, Colonel Campbell, Mr. S. Buxton, Mr. Bryce, and others. The Lord Advocate said that there was no conflict of opinion on the subject amongst the various sections of the House. On the question of financial aid, he might say that there was an immediate prospect of further money being available for education in Scotland. When the proper time came the Government would be prepared with a well-considered scheme of secondary education. The House would see that under these circumstances it was undesirable to pledge the Government to the terms of the resolution. This satisfactory assurance led of course to the withdrawal of the motion.

ON Sunday, February 8, the R. Università degli Studi at Naples is to hold a *festa* in honour of Prof. Arcangelo Scacchi, the eminent mineralogist, on the occasion of the fiftieth anniversary of his professoriate.

THE Essex Field Club, the foundation of which was noted in our columns eleven years ago (vol. xxi. pp. 215, 286, and 474), is about to enter on a new phase of its career. Since 1880, the Club has been carrying on most useful work in the county of Essex, and has deservedly taken rank as one of the most successful field clubs in the country. The publications now comprise some eight volumes of Transactions and Proceedings, together with the *Essex Naturalist*, the present form of the Club's journal. In addition to these publications, which are full of papers of local interest, the Club has also issued two volumes of "Special Memoirs"—the "Report on the East Anglian Earthquake," by Messrs. Meldola and White, and the "Birds of Essex," by Mr. R. M. Christy. Both of these volumes were reviewed in NATURE at the time of their publication. Although the Club has thus been carrying out its original programme for a period of eleven years, supported by a most energetic staff of officers, with Messrs. Meldola, Boulger, Holmes, and Fitch as successive Presidents, and Mr. William Cole as Honorary Secretary throughout the whole period of its existence, there is one branch of the Club's work which has been languishing, and which it is now proposed to take up and push forward with renewed vigour. It has always been present in the minds of the executive that one of the Club's functions was the establishment of a museum illustrating more especially the *local* natural history, geology, and prehistoric archæology of the county, but having also an educational side. Although there are already museums at Colchester, Chelmsford, and Saffron Walden, there is no establishment in the county which can be considered a local museum in the sense which the Club insists upon. To remedy this defect, and to set an example which it is hoped may be followed by other counties, an arrangement has been made between the Essex Field Club and the subscribers to the Essex and Chelmsford Museum, which was submitted to the Club at the eleventh annual general meeting held on Saturday, January 31, in the Museum at Chelmsford, under the presidency of Mr. E. A. Fitch. The formal resolution proposing the amalgamation of the two Societies was put to the meeting by Prof. Meldola, and seconded by Dr. Thresh, the Medical Officer of Health for the county, and carried unanimously. The two Societies will retain the name of the Essex Field Club, and the collections belonging to both will, it is hoped, be sooner or later combined, so as to form the nucleus of a museum in every sense worthy of the reputation of the Club and of the county. The draft scheme, which was submitted for final acceptation on Saturday, was drawn up by Mr. Cole, and had previously been adopted by the Committee of the Chelmsford Museum. An appeal will shortly be made on behalf of the amalgamated Societies for subscriptions from the public, and especially from those interested in the welfare of the county either as residents, as agriculturists, or as being concerned in its maritime industries. The funds thus raised are to be devoted to the erection and equipment of a museum building in Chelmsford, which is regarded as the most suitable locality for a county institution. Another scheme for extending the work of the Essex Field Club, in the direction of technical education, in accordance with the Local Taxation Act of 1890, was submitted formally to the Essex County Council on Monday last.

WE regret to announce the death of Dr. Karl Weihrauch, Director of the Meteorological Observatory of Dorpat, which occurred on January 19, in the fiftieth year of his age. As long ago as 1871 he was associated with Dr. Arthur von Oettingen in the management of that establishment, of which since 1876 he has had sole charge. The papers he has published have mainly had reference to the mathematical treatment of meteorological data.

M. ÉMILE REYNIER, well-known as an authority on electrical science, died of pneumonia on January 20, at the age of thirty-nine.

PARTICULARS have reached us of the death on October 31, 1890, of Mr. Cosmo Innes Burton, F.R.S.E., the first Professor of Chemistry in the Technical Institute recently founded by the English merchants in Shanghai. Mr. Burton, who was only in his twenty-eighth year, was well known in this country as an enthusiastic student of chemistry, well skilled in organic research, and exceptionally successful in University Extension lecturing. He was the youngest son of the late Dr. Hill Burton, Historiographer-Royal for Scotland, and inherited much of the versatility, originality, and conscientious laboriousness which distinguished his father. After studying at the Universities of Edinburgh, Munich, and Paris, he acted for a time as Research Assistant to Prof. Japp, at South Kensington, the record of his work being published in several papers. Returning to Edinburgh, he pursued private research and Extension lecturing until the appointment in China was offered to him last summer. He proceeded to Shanghai with his newly-married wife, and had just completed arrangements for commencing a course of lectures when his promising career of usefulness to science and to the world was ended by an attack of malignant small-pox.

THE London Chamber of Commerce, Botolph House, Eastcheap, are now displaying a most interesting collection of fibres of various kinds which have been supplied from the Kew Gardens Museum. The collection has been put together chiefly for the inspection and consideration of merchants and manufacturers.

THE expedition which is to be sent in the spring to the west coast of Greenland, by the committee of the Karl Ritter Endowment, is likely to be one of considerable importance. The chief of the expedition will be Dr. E. von Drygalski. Dr. O. Baschin will accompany it, defraying his own charges; and there will be a third scientific expert, who has not yet been selected. Dr. von Drygalski proposes to establish a station near the Umanackfjord, in about 70° 30′ north latitude, where Dr. Baschin will carry out a continuous series of meteorological observations, and from which he can make long or short excursions inland to study the interior ice. It is expected that the party will remain in Greenland about a year.

WE have received from Mr. Clement L. Wragge the following statement, written at Nouméa, New Caledonia, December 22, 1890:—"I have much pleasure in stating that I have just established a first-order meteorological station at Nouméa, under the auspices of the Queensland Government. The instruments are placed on the premises of the Australasian United Steam Navigation Company's agency, and consist of a fine Kew barometer by Adie; dry, wet, maximum, and minimum thermometers exposed in the 'Stevenson' screen (enlarged pattern); a Richard barograph and thermograph; capacious rain-gauge; earth-thermometers; and electric or 'turnover' thermometers of Negretti and Zambra's manufacture. The Governor of New Caledonia, M. Pardon, received me most kindly, and promised any assistance in his power. Early next month I hope to have placed a set of instruments at Aneiteum or Havannah, in the New Hebrides, and we also contemplate establishing a station at Tahiti, and other places in the South Pacific. Our observer at Nouméa is Mr. Samuel Johnston, a permanent resident, who takes a warm interest in the matter. Mr. Johnston's brother also assists, and every precaution has been taken to insure permanency and continuous records."

IN the first quarter of the year 1890, many places in Queensland suffered so severely from floods caused by excessive rainfall, that the Governor of that colony called for a special report upon the subject. This has been drawn up by Mr. Wragge, and contains numerous tables of rainfall for the months of January to March, 1888, 1889, and 1890, arranged for comparison. The report also contains data respecting the flood levels of certain rivers and creeks, and interesting reports of the condition of stock and state of country from the owners of cattle stations, referring both to the drought of 1888–89 and the floods of 1890. Mr. Wragge attributes the abnormal state of the weather which produced the floods to the unusual extension of the north-west monsoonal system, the isobars of which at times enveloped nearly the whole of Australia, thus changing the character of the usually arid conditions of the interior.

THE committee of the Lancashire County Council have recommended that the whole of the grant in aid made to the county of Lancaster under the Local Taxation (Customs and Excise) Act, 1890, should be appropriated for purposes of technical education, including agricultural and commercial instruction. The amount of the grant at the disposal of the county is estimated at £39,000. The committee have received 101 applications for assistance towards the expenses of carrying on existing schools and institutions for the purposes of technical instruction. They recommend that the special grant be placed to a separate account, to be applied in such manner as the Council may from time to time determine. It is recommended that grants be made to local authorities, or to institutions, schools, or classes under public management, the grants to be conditional upon suitable premises, appliances, and apparatus being provided. It is proposed to grant £500 for migratory lectures upon agricultural instruction, and to grant £500 for the purpose of assisting the formation of migratory dairy schools in such agricultural centres as would aid in their establishment by providing premises, appliances, and other facilities for the work.

THE *Oxford University Extension Gazette* reports that the County Council of Devonshire has voted £3000 for scientific lectures during the present year, and it is proposed to engage four lecturers to deliver twelve full courses on elementary mechanics and chemistry. Two of these lecturers are probably to be from Oxford, and two from Cambridge.

A MEMORIAL from the Dundee Chamber of Commerce, and numerous merchants, manufacturers, and others of that town, in favour of a decimal system of coinage, weights, and measures, was sent the other day to the Chancellor of the Exchequer. Mr. Goschen, in acknowledging the memorial, says:—"I must own frankly for myself that, though I am sensible that powerful arguments can be put forward in support of the decimal system, I cannot undertake to recommend its adoption to the country."

DR. GOEBEL has for some time been carrying on botanical researches in British Guiana. The Demerara *Argosy*, which speaks of his visit with much satisfaction, says that one of his chief objects is to study the morphology and life-history of a peculiar order of plants, of obscure affinities, known in systematic botany as the *Podostemaceæ*. "These plants" says the *Argosy*, "which grow on the submerged rocks in the falls and rocky river-beds of most or all of our main rivers, are known now to many of our gold diggers and others travelling up and down the rivers by the beautiful clusters or sheets of pink bloom which they present when the rivers subside and they become exposed in the dry seasons. They comprise many species and several genera. They adhere to the rocks, as seaweeds do, by the disk-like base of the stem, holding with such extreme tenacity in the stress and strain of the rushing waters that in removing them by manual force a portion of the rock is often broken away attached to the plant. The greater part of the year they are deeply submerged, floating as seaweed floats at the bottom of the sea, but as the waters subside in the dry seasons they take the opportunity while exposed to flower and fruit." There are numerous unsettled points as to their life-history, morphology, histology, &c., and, according to the *Argosy*, Dr. Goebel, on his return to Europe, will publish many results which are new to science and very interesting.

FROM Dorsetshire a singular instance of starlings being eaten by rooks is reported. It seems that, during the very severe weather we had lately, a flock of starlings was observed on a farm at West Stafford, near Dorchester, followed by a number of rooks in hot pursuit. The larger birds soon came up with their prey, and quickly despatched them, and, after stripping them of their feathers, devoured them then and there. When the scene of the occurrence was inspected, just afterwards, the ground was found to be strewn with their feathers, but beyond these not a vestige of the starlings could be discovered. It seems that the rooks, from sheer hunger, must have been driven to this extremity, owing to the scarcity of other kinds of food.

THE "Photographer's Diary and Desk-book" for the present year, which is issued by the proprietors of the *Camera*, should be in the possession of every photographer. It contains a good condensed account of dark-room procedure, including the latest discoveries that have been made in photographic printing. All the various formulæ, both for development and printing, which are recommended by each individual maker, have been revised, and are printed in a type that can be easily read in a dark-room. A few notes have been collected relating to some of the important and useful novelties in photographic apparatus, and in many cases illustrated. The diary part of the book consists of good smooth paper interleaved with blotting-paper, and ample room is allowed for the insertion of diary notes, with a few pages for memoranda. A useful addition might be made by carrying the diary a few days into the January of the following year; this might prove a source of convenience to many photographers.

THE report on the collection of birds made by the late Dr. Ferdinand Stoliczka, the naturalist of the Yarkand Mission of 1874, will shortly appear, when the record of Forsyth's expedition will be complete. The work was originally written by Mr. A. O. Hume, C.B., but the manuscript, on the eve of publication, was destroyed by a native servant, along with the other valuable manuscripts of this well-known naturalist. The collection of Yarkand birds was brought to England with the rest of the Hume collection by Mr. Bowdler Sharpe, who was entrusted by Mr. Hume with the task of completing the memoir. We understand that Mr. Sharpe has incorporated in his paper the chief results obtained by Dr. Henderson, Dr. Scully, and the other observers who accompanied the various expeditions to Eastern Turkestan, and will be a monographic report on the work done by all the English naturalists who have visited Central Asia.

WE learn from the *Times* that the Windsor and Eton Angling Preservation Association is about to place 1000 of the famous Loch Leven trout from Sir Gibson Maitland's Howietown fishery in the Thames waters in the Windsor district. The fish will be conveyed from Stirling in ten tanks. The artificial stocking of the river with trout has been carried out by the society with marked success, the captures during the last two years in the Windsor waters having been nearly double those of 1888.

IN 1868, Mr. A. S. Merry delivered a lecture before the Royal Institution of Swansea, under the title of "Heat." He has just published, in pamphlet form, the propositions then propounded. In this it is asserted that "interstellar space is occupied by two elements, which may be named electrine and thermine, which unite together and neutralize each other, forming the interstellar ether." All physical phenomena are explained on the supposition that this ether permeates all matter, and, under various conditions, is decomposed into its constituents. Absolute zero is produced by the perfect neutralization of thermine by electrine. Hence, on separating electrine from the ether, thermine is liberated, and the development of heat is the result.

THE Government of British North Borneo has accepted the sum of £100 from the Royal Geographical Society of Australasia, for Baron de Lissa to carry out a survey of Mount Kinabalu, which will be undertaken jointly with an agricultural survey by the Government of British North Borneo.

MESSRS. F. WARNE AND CO. will shortly issue the English edition of Major Casati's work, "Ten Years in Equatoria, and the Return with Emin Pasha." It will contain nearly two hundred original illustrations, and several maps.

IN NATURE of January 8 (p. 231) reference is made to Dr. J. D. E. Schmeltz as director of the Leyden Ethnographical Museum. The director is Dr. L. Serrurier. Dr. Schmeltz is "conservator" or assistant-keeper.

IN Mr. Howes's letter on "the morphology of the sternum," printed in NATURE of January 15 (p. 269), there is a mistake due to a slip of the pen. The word "presence" (line 7) ought to be "absence."

THE following are the arrangements for science lectures at the Royal Victoria Hall during February:—3rd, "From Dry Bones to Useful Material," by Mr. Ward Coldridge; 10th, "Plants and Animals of the Coal," by Prof. H. G. Seeley; 17th, "Our Chalk Hills," by Mr. F. W. Rudler; 24th, "A Trip to New Zealand," by Prof. Hall Griffin.

A THEORY attempting to explain the nature of the relationship between the optical activity of many substances in solution, and the hemihedrism of their crystalline forms, is advanced by Dr. Fock, the author of the new work on chemical crystallography, in the current number of the *Berichte*. It is certainly a most significant fact that all those substances whose solutions are capable of rotating the plane of polarization of light, and whose crystalline forms have been thoroughly investigated, are found to form hemihedral crystals—that is to say, crystals some of whose faces have been suppressed, and whose two ends are therefore differently developed. Moreover, in those cases where both the right rotatory and left rotatory varieties of the same chemical compound have been isolated and examined, as in the case of dextro- and lævo-tartaric acid, the hemihedral crystals are found to be complementary to each other, the faces undeveloped upon the one being present upon the other, so that the one is generally as the mirror-image of the other. Several ingenious attempts to account for the wonderful geometrical arrangement of the molecules in a crystal have been made of recent years by Bravais, Mallard, and others, who developed the "Raumgitter" theory, and by Sohncke, who showed that all possible crystallographical forms could be referred to systems of points; yet it has been found necessary by these crystallographers to assume a polarity of the molecule itself in order to fully explain the phenomenon of hemihedrism. This conclusion is, moreover, borne out by the more recent work of Lehmann upon his so called "liquid crystals." It is, indeed, evident that hemihedral crystals owe their hemihedrism to a differentiation of the various parts of the molecules themselves in space. Dr. Fock assumes, for the purpose of connecting this fact with the optical rotation of the dissolved crystals, the tetrahedral form for the element carbon, in the most recent conventional sense employed by Wislicenus, Van't Hoff, Victor Meyer, and other exponents of the new "stereo-chemistry." The axis of polarity of a molecule containing an asymmetric carbon atom, will, of course, be determined by its centre of gravity and the heaviest "corner" of the tetrahedron, and Dr. Fock shows that rotation of the molecule will be most easy round this axis, and in the direction, right or left, determined by the relative weights of the atoms or groups disposed at the other three "corners." He further shows that, if we consider any direction of vision through the solution, we must practically consider two positions of the molecules, in both of which the axis of rotation is parallel with our line of sight, and in one of which the apex of the tetrahedron is turned towards us, and in the other is directed away from us and the other three corners presented to us. As the molecules are, of course, in rapid motion, we must consider all other positions as balancing each other, and being resolved eventually into these two directions. It is then easy to see, as it is now accepted from Fizeau's work that the movement of molecules is capable of influencing the direction of light-waves, that there must be two oppositely moving circularly polarized rays produced. Now, it is generally supposed that the rotation of liquids is really due to the division of the light into two circularly and oppositely polarized rays, one of which, however, is stronger than the other, and determines the apparent optical activity. Dr. Fock completes his theory by showing the probability that there would be just this difference in the amount of rotation of the light in the two cases of the differently disposed molecules, those with their "apices" turned towards the direction of incidence of the light affecting it to a different extent from those whose "bases" were the first to receive it. The theory is well worth following out in the original memoir, many confirmations of it being adduced from other properties of hemihedral crystals.

THE additions to the Zoological Society's Gardens during the past week include a Red-necked Grebe (*Podiceps griseigena*), presented by Mr. Thos. Hardcastle; two Japanese Pheasants (*Phasianus versicolor* ♂ ♀) from Japan, presented by Mr. E. Wormald, F.Z.S.; two Passerine Owls (*Glaucidium passerinum*), European, presented by Mr. St. John Northcote; forty River Lampreys (*Petromyzon fluviatilis*) from British fresh waters, presented by Mr. Thos. F. Burrows; a Black-headed Lemur (*Lemur brunneus* ♂) from Madagascar, a Triton Cockatoo (*Cacatua triton*) from New Guinea, deposited; a Milne-Edwards Porphyrio (*Porphyrio edwardsi*), a Grey-headed Porphyrio (*Porphyrio poliocephala*) from Siam, purchased; a Variegated Sheldrake (*Tadorna variegata*) from New Zealand, an Indian Python (*Python molurus*) from India, received in exchange; an American Bison (*Bison americanus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE TRANSITS OF VENUS IN 1761 AND 1769.—The Astronomical Papers prepared for the use of the American Ephemeris and Nautical Almanac, vol. ii. Part 5, contain a discussion of observations of the transits of Venus in 1761 and 1769, by Prof. Simon Newcomb. The discussion was undertaken because of the mutations of opinion as to the value of the observations. For more than a century these observations were looked upon as affording the best data for the determination of the solar parallax. Now, however, opinion leans considerably to the opposite direction.

The general theory on which all the previous discussions were founded is said by Prof. Newcomb to be (1) that the formation of the thread of light at ingress and its breaking at egress mark the true time of tangency of the dark limb of Venus with the bright limb of the sun; (2) that a definite interval intervenes between this formation or breaking of the thread of light and the moment known as apparent or geometric contact of the limbs, which interval arises from and depends upon irradiation. A little consideration, however, will show that the time of formation of the thread of light, and therefore the interval between the two phases of contact, must vary with the observer, the quality of the telescope employed, and the conditions of vision. The clearer and steadier the air, and the sharper the vision, the more nearly must the two phases approach each other, until, under the best conditions, they come together. The indefinite and varying character of the phenomena, therefore, favours the division of the observations into the following classes: (1) those in which the formation or extinction of the thread of light is stated to have been observed; (2) cases in which some phenomenon of contact was noted earlier than the formation of the thread of light at ingress or later than its disappearance at egress; (3) observations in which no statement is made from which it can be inferred that one phase rather than the other was observed. These different kinds of observation have been satisfactorily treated by introducing corrections into the equations of condition.

The collected observations take up a large amount of space, and are of prime importance. Their classification and discussion, and the treatment of residuals in the formation of the equations of condition, is also in keeping with Prof. Newcomb's previous work. With respect to the values of the coefficients expressing the effect of imperfections of vision upon the visibility of the contacts, it is concluded that—(1) under the worst ordinary conditions of vision, Venus, at visible external contact, impinged heliocentrically 0″·7 further upon the sun than it did under the best conditions, telescopic and atmospheric; (2) in the case of second contact the thread of light, when first seen, was heliocentrically 0″·16 thicker under the worst than under the best conditions; (3) in the case of third contact no difference is shown in the thickness of the thread of light under different conditions when it vanished from sight.

When the weights of the observations of contacts III. and IV. in 1761, and contacts I., II., III., IV. in 1769, are considered, the value found for the equatorial horizontal parallax of the sun is

$$\pi = 8''{\cdot}79 \pm 0''{\cdot}051 \text{ or } \pm 0''{\cdot}034,$$

where 0″·051 represents the mean error, and 0″·034 the probable one.

The mean probable result found by Encke from a discussion of the same observations was 8″·571, with an estimated probable error of 0″·037, which error was afterwards found to be too small. A variety of causes are put forward to account for the wide difference in the results, and it is hoped that some other astronomer will be able to make a thorough comparison of the two determinations.

Prof. Newcomb also provisionally concludes that the correction to Leverrier's latitude of Venus at the descending node for the mean of 1761 and 1769 is +1″·915, while the correction to Leverrier's longitude of the node (1765·5) appears to be +32″·4.

LEYDEN OBSERVATORY.—The fifth and sixth volumes of the *Annalen der Sternwarte in Leiden* have recently been issued by the Director, Dr. H. G. Van de Sande Bakhuyzen. The observations of stars contained in the former volume have been made with the usual care. The latter deals with the reduction of the zenith distances of several stars.

THE PRINCIPLE OF LAMARCK AND THE INHERITANCE OF SOMATIC MODIFICATIONS.[1]

> "To reject the influence which use or disuse of a part may have on the individual or on its descendants is to look at an object with one eye."—SIR WILLIAM TURNER.

IN last year's lectures we divided the factors of organic evolution into two great classes—firstly, primary factors; and secondly, secondary factors.

The primary factors are those which act directly on the individuals of a given generation; or indirectly on the individuals of the succeeding generation in consequence of a modification of the reproductive elements. Such are light, heat, climate in a general way, nutriment, the nature of the water for aquatic organisms, &c. Further primary factors are the ethological reactions of animals or plants against the inorganic and the living surroundings—what Lamarck called their needs and habits, what Darwin named the struggle for existence, sexual competition, migrations, &c.

We have seen that the action of these primary factors alone and of heredity could give rise to new races and consequently to new species, according to the law of Delbœuf. For this it is enough that the factors act continuously or even periodically, and that the changes produced are not disadvantageous to the modified organism; because, in this last case, natural selection comes into play and rapidly produces an elimination of the less favourable. But the most constant of primary factors of evolution are strongly aided by the secondary ones. These preserve and rapidly augment the results brought about by the primary factors, and determine the adaptation to any given environment of the forms whose variability has been acting. In the case of fully differentiated organisms, *i.e.* all whose parts are specially and rigorously adapted to definite conditions of existence, when a primary factor begins to modify one of these conditions, a return to biological equilibrium is henceforth impossible, and the organism vanishes. This explains the disappearance in olden times of highly differentiated forms (Trilobites, Ammonites, &c.) as a result of apparently unimportant changes in the state of the surroundings. Thus we also can understand how very slight ethological modifications would promptly bring about the annihilation of so highly specialized types as Peripatus, Ornithorhynchus, &c.

But on organisms still possessing a certain plasticity, still having a certain number of elements of unfixed value to dispose of, the action of primary factors causes only a momentary rup-

---

[1] Prof. Giard's opening lecture, in the Sorbonne, of his course on "Organic Evolution" (chair founded by the City of Paris).